

CLAIMS

1. A fuel cell power system, comprising:
- a module receiving assembly;
 - a module frame having an internal cavity, and which slideably matingly cooperates both electrically and in fluid flowing relation with the module receiving assembly;
 - a fuel cell stack mounted in the internal cavity;
 - a controller which is electrically coupled to the fuel cell stack; and
 - a cooling assembly borne by the module frame, and which directs a flow of air from ambient through the fuel cell stack, and which returns the air to ambient to facilitate the dissipation of heat generated while the fuel cell stack is operational.
2. The fuel cell power system as claimed in claim 1, wherein the cooling assembly further comprises at least one fan which facilitates the movement of the air from ambient, through the fuel cell stack, and back to ambient.
3. The fuel cell power system as claimed in claim 1, wherein the cooling assembly further comprises at least one fan mounted in the internal cavity of the module frame, and which facilitates the movement of the air from ambient, through the fuel cell stack, and back to ambient.

4. The fuel cell power system as claimed in claim 1, wherein the cooling assembly creates a pressure gradient across the fuel cell stack which facilitates the movement of the air from ambient, through the fuel cell stack, and back to ambient.

5. The fuel cell power system as claimed in claim 1, wherein the cooling assembly creates a temperature gradient across the fuel cell stack which facilitates the movement of the air from ambient, through the fuel cell stack, and back to ambient.

6. The fuel cell power system as claimed in claim 1, wherein the module frame has opposite front and rear walls and is defined by a major axis which extends between the opposite front and rear walls, and wherein the cooling assembly further comprises an air plenum which is coupled in fluid flowing relation to ambient, and which extends substantially between the front and rear walls of the module frame.

7. The fuel cell power system as claimed in claim 6, wherein the cooling assembly further comprises at least one fan operably coupled to the air plenum, and which facilitates the movement of the air from ambient, along the air plenum, through the fuel cell stack, and back to ambient.

8. The fuel cell power system as claimed in claim 6, wherein the cooling assembly further comprises at least one fan mounted in the internal cavity of the module frame and operably coupled to the air plenum, and which facilitates the movement of the air from ambient, along the air plenum, through the fuel cell stack, and back to ambient.

9. The fuel cell power system as claimed in claim 6, wherein the air plenum directs the air to flow in a substantially ogee shaped path of travel.

10. The fuel cell power system as claimed in claim 6, wherein the air plenum has a variable diameter, and wherein variations in the diameter of the air plenum cause the velocity and pressure of the air to vary as it flows through the air plenum.

11. The fuel cell power system as claimed in claim 1, wherein the module frame has opposite first and second sidewalls, and wherein the cooling assembly further comprises an air plenum which extends substantially between the first and second sidewalls of the module frame, and wherein the air plenum is coupled in fluid flowing relation to ambient.

12. The fuel cell power system as claimed in claim 11, wherein the cooling assembly further comprises at least one fan operably coupled to the air plenum, and which facilitates the movement of the air from ambient, along the air plenum, through the fuel cell stack, and back to ambient.

13. The fuel cell power system as claimed in claim 11, wherein the cooling assembly further comprises at least one fan mounted in the internal cavity of the module frame, and which is operably coupled to the air plenum to facilitate the movement of the air from ambient, along the air plenum, through the fuel cell stack, and back to ambient.

14. The fuel cell power system as claimed in claim 1, wherein the module frame has opposite top and bottom surfaces, and wherein the cooling assembly further comprises an air plenum which extends substantially between the top and bottom surfaces of the module frame, and wherein the air plenum is coupled in fluid flowing relation to ambient.

15. The fuel cell power system as claimed in claim 14, wherein the cooling assembly further comprises at least one fan operably coupled to the air plenum, and which facilitates the movement of the air from ambient, along the air plenum, through the fuel cell stack, and back to ambient.

16. The fuel cell power system as claimed in claim 14, wherein the cooling assembly further comprises at least one fan mounted in the internal cavity of the module frame and operably coupled to the air plenum, and which facilitates the movement of air from ambient, along the air plenum, through the fuel cell stack, and back to ambient.

17. A fuel cell power system, comprising:

- a module receiving assembly;
- a module frame having opposite front and rear walls which define in part an internal cavity, and which is further defined by a major axis extending between the opposite front and rear walls, and which slideably matingly cooperates both electrically and in fluid flowing relation with the module receiving assembly;
- a fuel cell stack mounted in the internal cavity;
- a controller which is electrically coupled to the fuel cell stack; and
- a cooling assembly borne by the module frame and coupled to the controller, and which dissipates heat energy generated by the fuel cell stack while it is in operation; and wherein the cooling assembly further includes an air plenum which extends substantially between, the front and rear walls, and which is coupled in fluid flowing relation to ambient, and which directs a flow of air from ambient, along the air plenum, through the fuel cell stack, and back to ambient, and a fan mounted in the internal cavity of the module frame, and which is operably coupled to the air plenum to facilitate movement of the air along the air plenum.

18. The fuel cell power system as claimed in claim 17, wherein the air plenum further comprises:

a first portion disposed in laterally offset substantially parallel relation relative to the major axis, and which directs the flow of air from ambient into the internal cavity;

a second portion of the air plenum coupled in fluid flowing relation to the first portion, and which further directs the flow of air generally transversely across the major axis and through the fuel cell stack; and

a third portion of the air plenum disposed in laterally offset, substantially parallel relation, relative to the major axis, and which is coupled in fluid flowing relation to the second portion, and which further directs the flow of air back to ambient.

19. The fuel cell power system as claimed in claim 18, wherein the air plenum directs the air to flow in a substantially ogee shaped path of travel.

20. The fuel cell power system as claimed in claim 19, wherein the air plenum has a variable diameter, and wherein variations in the diameter of the air plenum cause the velocity and pressure of the air flowing through the air plenum to vary.

21. The fuel cell power system as claimed in claim 18, wherein the fan is mounted near the first end of the module frame and is operably coupled with the first portion of the air plenum, and wherein the fan facilitates the movement of the air from ambient into the first portion of the air plenum.

22. A fuel cell power system, comprising:

- a module receiving assembly;
- a module frame defining an internal cavity, and which has opposite first and second ends, and which slideably matingly cooperates both electrically and in fluid flowing relation with the module receiving assembly;
- a fuel cell stack mounted in the internal cavity;
- a controller which is electrically coupled to the fuel cell stack; and
- a cooling assembly which directs a flow of cooling fluid along a substantially non-linear path of travel between the first and second ends of the module frame, and through the fuel cell stack to dissipate heat energy generated by the fuel cell in operation.

23. The fuel cell power system as claimed in claim 22, wherein a major axis extends between the opposite first and second ends of the module frame, and wherein the cooling assembly includes a cooling fluid path which directs the flow of cooling fluid.

24. The fuel cell power system as claimed in claim 23, wherein the cooling fluid path directs the cooling fluid to flow in a substantially ogee shaped path of travel.

25. The fuel cell power system as claimed in claim 23, wherein the cooling fluid path further comprises:

a first portion disposed in laterally offset substantially parallel relation relative to the major axis, and which directs the flow of cooling fluid into the internal cavity;

a second portion of the cooling fluid path coupled in fluid flowing relation to the first portion, and which further directs the flow of the cooling fluid generally transversely relative to the major axis and through the fuel cell stack; and

a third portion of the cooling fluid path disposed in laterally offset, substantially parallel relation, relative to the major axis, and which is coupled in fluid flowing relation to the second portion, and which further directs the flow of cooling fluid out of the internal cavity.

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